

Norton Sound Summer Commercial Red King Crab Fishery
Project Report, 1999

By

Elisabeth L. Brennan

Regional Information Report¹ No. 3A00-16

Alaska Department of Fish and Game
Commercial Fisheries Division, AYK Region
333 Raspberry Road
Anchorage, Alaska 99518

March 2000

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ABSTRACT

The objectives for the 1999 summer king crab project were to monitor commercial harvest of red king crab on a daily basis, compile the catch data necessary to generate the data tables used for inseason management, measure and determine carapace length, age, and sex of sampled crab in the commercial harvest, determine the percentage of recruits in the commercial harvest sample (new shell legal crab with carapace length less than or equal to 115 mm), and measure and record shell length and age of recaptured tagged king crab. The 1999 summer commercial red king crab fishery opened at 12 noon, July 1 in the Norton Sound Section. The total commercial catch was 8,734 crab. A total of 23,553 pounds was harvested. Ten vessels made deliveries, and 9 permit holders fished. Average weight for commercially caught crab was 2.7 lb./crab. A total of 360 pots were registered and 1,630 pot pulls were recorded during the fishery. The average price/pound was \$3.08. The fishery value was approximately \$72,543. Recruit crab made up 41.7% of all legal male crab sampled. Postrecruit crab made up 58.3% of the legal crab sampled. The 1999 crab fishery season had the second lowest number of vessels and lowest number of fishermen participating since regulations changed the character of the summer season in 1993. The factors contributing to the low participation rate and the low harvest rate were: 1. No local buyer because of the 80,000 pound guideline harvest, 2. Transportation of crab to buyers in Anchorage was difficult to arrange, and 3. There was no incentive with the License Limitation Program to encourage fisher participation. The guideline harvest is expected to increase significantly in future years. Participation of commercial buyers and fishers is anticipated to increase as well.

INTRODUCTION

The Norton Sound Section of the Northern Bering Sea District consists of all waters in statistical area Q that are north of the latitude of Cape Romanzof, east of 168 west longitude, and south of the latitude of Cape Prince of Wales (Figures 1 and 2). A large vessel summer commercial red king crab (*Paralithodes camtschatica*) fishery existed in the Norton Sound Section from 1977 through 1992. No summer commercial fishery occurred in 1991 due to a lack of staff necessary to manage the fishery. The budget had been cut the previous winter. In 1992 the large vessel summer commercial fishery resumed. Regulation changes adopted during the March 1993 Board of Fisheries meeting changed the character of the fishing fleet to that of a small boat fleet. A superexclusive designation went into effect for the Norton Sound commercial crab fishery June 27, 1994. A vessel registered for the Norton Sound crab fishery may not be used to take king crab in any other registration area during that registration year. A vessel moratorium was put into place prior to the 1996 season with the intention to create a license limitation program in the near future.

The National Marine Fisheries Service conducted their most recent trawl survey to examine the abundance of Norton Sound red king crab in late August 1991 (Appendix Table 5). The results of that survey as compared to the 6 previous trawl surveys show a gradual trend of increasing abundance since 1982. The 1991 survey found 3.5 million pounds of legal king crab in the commercial fishing district. NMFS has not made a survey of Norton Sound since 1991. The quota for the Norton Sound Section for the 1996 season had been set at 340,000 pounds, to approximate an exploitation rate of 10%.

The Alaska Department of Fish and Game conducted a trawl survey to examine the abundance of Norton Sound red king crab from August 7 through August 18, 1996 (Appendix Table 5). A population estimate was generated which indicated the legal biomass had declined to 40 percent of the biomass estimated in 1991. The results from the 1996 trawl survey prompted the fishery managers to reduce the harvest rate in the 1997, 1998 and 1999 commercial fishery to five percent of the legal biomass and set the guideline harvest at 80,000 pounds. This is a significant reduction from the previous exploitation rate and guideline harvest. The Alaska Department of Fish and Game conducted a trawl survey from July 28 until August 8, 1999. The population estimate from this survey will not be complete until April 2000.

Objectives and Tasks

The objectives for the 1999 summer king crab project were to:

1. Monitor commercial harvest of red king crab on a daily basis.
2. Inform processors and fishers of:
 - a. Fishery regulations.

- b. Fish buying and reporting requirements.
 - c. Management strategies.
3. Assist in public relations and inform the public of the status of the commercial fishery.
 4. Compile the catch data necessary to generate the data tables used for inseason management.
 5. Measure and determine carapace length, age, and sex of sampled crab in the commercial harvest.
 6. Determine the percentage of recruits in the commercial harvest sample (new shell legal crab with carapace length less than or equal to 115 mm).
 7. Measure and record shell length and age of recaptured tagged king crab.
 8. Draft a project report which includes text, tables, and figures that summarizes the fishery and is incorporated into the report to the Alaska Board of Fisheries.

METHODS

The methods used during the 1999 commercial crab season for catch monitoring and reporting, sampling crab, skipper interviews, and collecting information from tagged crab are presented in the ADF&G Norton Sound King Crab Operational Plan.

Catch reporting logs were kept by skippers of catcher vessels for each delivery. Fish tickets were due in to the ADF&G office on Monday of each week throughout the duration of the fishery. Reports from fishers and catcher/seller fish tickets were required every Monday for the duration of the fishery. Compliance with reporting requirements was fair.

RESULTS

Harvest Summary

The 1999 summer commercial red king crab fishery opened at 12 noon, July 1 in the Norton Sound Section. An emergency order relaxing the closure line described in regulation eastward to 161° 30' west longitude was announced June 19 to be effective at the fishery opening on noon July 1. Another emergency order was announced July 2 relaxing the nearshore closure line in the vicinity of Unalakleet eastward to 161° 15' west

longitude effective noon July 3. Residents of eastern Norton Sound had requested that commercial fishing be allowed in areas more accessible to their communities. One commercial fisher had registered to fish in this eastern Norton Sound statistical area. Over the past year there has been some discussion of the impacts of relaxing the eastern Norton Sound line and changing the fishing season. Because there was only a limited market for king crab in Norton Sound during the 1999 season and because the timing of fish migrations had been delayed, there was an opportunity to gather information about the impacts of fishing early and nearer the eastern shore. A fishing vessel fishing in this open area was required to have an ADF&G observer on board to record size and health of the crab caught. The limited commercial effort was not expected to have significant impact on the distribution of crab harvest between commercial and subsistence users of the resource.

The first fishers registered July 1, and the first delivery was not made until July 7. The fishery was closed by emergency order at 12 noon, September 4. The fishery had been extended 24 hours due to poor weather in order to provide fishers an opportunity to get all their pots out of the water in a safe and cost effective manner. The final delivery was made on September 7. Fishers had checked and pulled all fishing pots prior to the closure, but left a storage pot full of harvested crab out until they coordinated their market. A total of 10 fishing vessels and fishers were registered for the summer commercial crab season. All fishers were registered as catcher/sellers because no registered crab buyer was present in the ports of Nome or Unalakleet. Catcher/sellers coordinated flying live crab to buyers in Anchorage and sold live crab off the dock locally. One vessel over 32 feet participated in the 1999 summer season. This vessel was 45 feet in length and obtained an interim moratorium permit to participate in the 1999 crab fishery. No floating crab processors or catcher/processors operated in Norton Sound during the 1999 summer fishery, therefore no independent observers were placed on board commercial vessels. One fishing vessel based out of the Unalakleet area had an ADF&G observer on board for two of its trips to monitor crab catches. Port sampling in Nome was attempted at various times throughout the fishery. Because of the lack of a buying station in Nome, no commercial sampling was done due to erratic scheduled boat trips and problems with airline scheduling of shipments of crab out of town. Fishers would hold their live crab in pots just offshore until they could schedule airline transport to haul live crab to Anchorage. Shipment would often be late at night as space allowed. Erratic scheduling also caused problems with fishers and their Anchorage markets.

The total commercial catch was 8,734 crab (Table 1). A total of 23,553 pounds were harvested. Ten vessels made deliveries, and 9 permit holders fished. Average weight for commercially caught crab was 2.7 lb./crab. A total of 360 pots were registered and 1,630 pot pulls were recorded during the fishery. The average price/pound was \$3.08. The fishery value was approximately \$72,543. Daily catch statistics can be found in Table 1 and Figure 3.

Fish ticket reports document that 8 statistical areas were fished (Table 2, Figure 6). Statistical area 636401 had the highest catch with 14,201 pounds taken or approximately

60.3% of the entire harvest. The second highest catch came from statistical area 646330 which was 3,021 lbs or 12.8% of the harvest. The overall CPUE for the 1999 fishery was 5.4 crab/pot (Table 1). Statistical area 646401 had the greatest CPUE with 17.5 crab/pot (Table 2).

Legal Male King Crab

Carapace length measurements and shell age were collected from 561 legal male red king crab throughout the 1999 summer fishery and during the 1999 Norton Sound king crab trawl survey (334 legal male crab from the summer fishery, 227 from the trawl survey). Carapace age was classified as new (11 months old) or old (at least 23 months old) (Table 3, Figure 4). Overall mean carapace length of the legal male red king crab sampled was 118.1 mm (Table 3). Male crab with new shell carapaces made up 87.9% of the total legal male king crab sampled, and old shell crab made up 12.1% of the sample (Table 3, Figure 4). Recruit crab made up 41.7% of all legal male crab sampled (Table 3). Postrecruit crab made up 58.3% of the legal crab sampled.

Tagged Crab

Five male crab with tags were returned to the ADF&G office during the 1999 commercial fishery (Table 4). All but one of these five tagged crab had been tagged in 1999. The crab with tag number NX3017 was tagged March 9, 1995 and grew 37 mm. Three tags with no crab were also returned. These three tags provided no useful growth information.

SUMMARY

There has been a change in the character of the summer commercial fishery toward a small boat fleet since 1993 due to regulation changes affecting pot limits, opening dates and a regulation making Norton Sound a superexclusive registration area. An ADF&G sampler has been stationed in Nome, and samples the commercial catch at the dock as it is delivered to buyers. During the 1999 season no commercial sampling was done at the port of Nome due to erratic scheduled boat trips and problems with airline scheduling of shipments of crab out of town. There was no local buyer of crab in Nome during the season. Fishers would hold their live crab in pots just offshore until they could schedule airline transport to haul live crab to Anchorage. Shipment would often be late at night as space allowed. The smaller catcher vessels take longer to make the runs to check pots, and have to be more cautious of weather. In the past four seasons, some vessels have based their operations out of the village of Golovin. This was due to its close proximity to more productive statistical areas. There has been a shift in the fishery effort and harvest eastward and closer to shore since 1992. This is due in part to the change in character of the fishery to that of a small vessel fishery, a relaxation of the closure line northward and

eastward in 1993, 1994 and 1995, and a diminished number of legal crab in the western statistical areas. Comparisons of the annual summer commercial harvest of crab by statistical area can be found in Appendix Table 1.

The 1999 season had the second lowest number of vessels and lowest number of fishers participating since regulations changed the character of the summer season in 1993. The ex-vessel value of the 1999 fishery is estimated at \$72,543 (Appendix Tables 2 and 3) and is the second lowest value in the history of the fishery. In 1999 there was no incentive with the License Limitation Program to encourage fisher participation. There was no local buyer, because the guideline harvest was a low 80,000 pounds. Transportation of the crab catch was difficult to arrange. These factors contributed to the low participation rate and the low harvest rate. The guideline harvest is expected to increase significantly in future years. Participation of commercial buyers and fishers is anticipated to increase as well.

Table 1. Daily catch (using fish ticket data) for the commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, July 1 - September 4, 1999^a

Date	Permits	Landings	Number of Crab	Lbs of Crab Harvested	Cumulative Total (lbs)	No. of Pots Pulled	Average Weight (lbs)	CPUE
7/7/1999	1	1	310	1,050	1,050	40	3.4	7.8
7/8/1999	1	1	35	123	1,173	2	3.5	17.5
7/9/1999	2	5	370	1,171	2,344	90	3.2	4.1
7/10/1999					2,344			
7/11/1999	1	1	125	352	2,696	40	2.8	3.1
7/12/1999	1	1	56	153	2,849	40	2.7	1.4
7/13/1999					2,849			
7/14/1999	2	2	99	271	3,120	34	2.7	2.9
7/15/1999					3,120			
7/16/1999					3,120			
7/17/1999					3,120			
7/18/1999	1	1	455	1,365	4,485	70	3.0	6.5
7/19/1999					4,485			
7/20/1999					4,485			
7/21/1999	1	2	100	230	4,715	38	2.3	2.6
7/22/1999	3	6	807	2,116	6,831	145	2.6	5.6
7/23/1999	2	2	652	1,908	8,739	87	2.9	7.5
7/24/1999					8,739			
7/25/1999	1	1	52	150	8,889	19	2.9	2.7
7/26/1999	1	2	154	385	9,274	19	2.5	8.1
7/27/1999	2	2	270	812	10,086	47	3.0	5.7
7/28/1999	1	1	2	8	10,094	14	4.0	0.1
7/29/1999					10,094			
7/30/1999					10,094			
7/31/1999					10,094			
8/1/1999	1	2	338	1,192	11,286	80	3.5	4.2
8/2/1999	1	1	21	74	11,360	10	3.5	2.1
8/3/1999					11,360			
8/4/1999					11,360			
8/5/1999	1	1	183	451	11,811	17	2.5	10.8
8/6/1999	1	3	255	727	12,538	100	2.9	2.6
8/7/1999					12,538			
8/8/1999					12,538			
8/9/1999	2	3	483	1,143	13,681	118	2.4	4.1
8/10/1999					13,681			
8/11/1999					13,681			
8/12/1999	1	1	104	265	13,946	12	2.5	8.7
8/13/1999	1	1	498	1,139	15,085	80	2.3	6.2
8/14/1999					15,085			
8/15/1999	1	1	84	245	15,330	13	2.9	6.5
8/16/1999	1	1	107	313	15,643	20	2.9	5.4
8/17/1999	1	1	167	461	16,104	20	2.8	8.4
8/18/1999					16,104			
8/19/1999					16,104			
8/20/1999	1	1	950	1,824	17,928	85	1.9	11.2
8/21/1999					17,928			
8/22/1999					17,928			
8/23/1999					17,928			
8/24/1999					17,928			
8/25/1999	2	2	1,052	2,690	20,618	114	2.6	9.2
8/26/1999					20,618			
8/27/1999	1	1	281	930	21,548	40	3.3	7.0
8/28/1999	2	2	290	875	22,423	78	3.0	3.7
8/29/1999					22,423			
8/30/1999					22,423			
8/31/1999	1	1	191	429	22,852	60	2.2	3.2
9/1/1999					22,852			
9/2/1999					22,852			
9/3/1999					22,852			
9/4/1999					22,852			
9/5/1999					22,852			
9/6/1999 ^b	2	2	218	632	23,484	78	2.9	2.8
9/7/1999 ^b	1	1	25	69	23,553	20	2.8	1.3
Totals			8,734		23,553	1,630	2.7	5.4

^a The commercial season was extended 24 hours due to weather

^b Season was closed 9/4/99, but crab was delivered and sold after this date

Table 2. Red king crab summer commercial harvest (from fish ticket reports) by statistical area for Norton Sound Section, Eastern Bering Sea, July 1 - September 4, 1999.

Statistical Area	Number	Pounds	Pots Pulled	CPUE	Average Weight (Lbs.)	Percent of Pots Pulled in Stat. Area (%)	Percent Harvest in Stat. Area (%)
616331	185	633	42	4.4	3.42	2.6	2.7
626401	150	508	20	7.5	3.39	1.2	2.2
636401	5,522	14,201	886	6.2	2.57	54.4	60.3
646330	1,027	3,021	182	5.6	2.94	11.2	12.8
646401	70	221	4	17.5	3.16	0.2	0.9
656330	509	1,300	88	5.8	2.55	5.4	5.5
656401	990	2,739	368	2.7	2.77	22.6	11.6
666401	281	930	40	7.0	3.31	2.5	3.9
Total:	8,734	23,553	1,630	5.4	2.70		

Table 3. Carapace length measurement summary of sampled legal male red king crab captured during the commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, July 1 - September 4, 1999 and during the 1999 Norton Sound king crab trawl survey.

Carapace Length (mm)	New shell			Old shell			Total		
	No.	Ave Length Calc.	%	No.	Ave Length Calc.	%	No.	Ave Length Calc.	%
95	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
96	1	0.2	0.2%	0	0.0	0.0%	1	0.2	0.2%
97	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
98	1	0.2	0.2%	0	0.0	0.0%	1	0.2	0.2%
99	3	0.6	0.5%	0	0.0	0.0%	3	0.5	0.5%
100	6	1.2	1.1%	1	1.5	0.2%	7	1.2	1.2%
101	7	1.4	1.2%	0	0.0	0.0%	7	1.3	1.2%
102	11	2.3	2.0%	0	0.0	0.0%	11	2.0	2.0%
103	7	1.5	1.2%	0	0.0	0.0%	7	1.3	1.2%
104	17	3.6	3.0%	2	3.1	0.4%	19	3.5	3.4%
105	17	3.6	3.0%	2	3.1	0.4%	19	3.6	3.4%
106	14	3.0	2.5%	0	0.0	0.0%	14	2.6	2.5%
107	13	2.8	2.3%	3	4.7	0.5%	16	3.1	2.9%
108	11	2.4	2.0%	0	0.0	0.0%	11	2.1	2.0%
109	20	4.4	3.6%	0	0.0	0.0%	20	3.9	3.6%
110	30	6.7	5.3%	2	3.2	0.4%	32	6.3	5.7%
111	17	3.8	3.0%	1	1.6	0.2%	18	3.6	3.2%
112	14	3.2	2.5%	2	3.3	0.4%	16	3.2	2.9%
113	12	2.8	2.1%	1	1.7	0.2%	13	2.6	2.3%
114	14	3.2	2.5%	4	6.7	0.7%	18	3.7	3.2%
115	19	4.4	3.4%	1	1.7	0.2%	20	4.1	3.6%
116	11	2.6	2.0%	2	3.4	0.4%	13	2.7	2.3%
117	17	4.0	3.0%	5	8.6	0.9%	22	4.6	3.9%
118	9	2.2	1.6%	3	5.2	0.5%	12	2.5	2.1%
119	16	3.9	2.9%	4	7.0	0.7%	20	4.2	3.6%
120	15	3.7	2.7%	1	1.8	0.2%	16	3.4	2.9%
121	11	2.7	2.0%	0	0.0	0.0%	11	2.4	2.0%
122	12	3.0	2.1%	1	1.8	0.2%	13	2.8	2.3%
123	13	3.2	2.3%	6	10.9	1.1%	19	4.2	3.4%
124	11	2.8	2.0%	4	7.3	0.7%	15	3.3	2.7%
125	14	3.5	2.5%	3	5.5	0.5%	17	3.8	3.0%
126	9	2.3	1.6%	3	5.6	0.5%	12	2.7	2.1%
127	11	2.8	2.0%	6	11.2	1.1%	17	3.8	3.0%
128	15	3.9	2.7%	6	11.3	1.1%	21	4.8	3.7%
129	9	2.4	1.6%	0	0.0	0.0%	9	2.1	1.6%
130	11	2.9	2.0%	0	0.0	0.0%	11	2.5	2.0%
131	10	2.7	1.8%	1	1.9	0.2%	11	2.6	2.0%
132	9	2.4	1.6%	2	3.9	0.4%	11	2.6	2.0%
133	4	1.1	0.7%	0	0.0	0.0%	4	0.9	0.7%
134	9	2.4	1.6%	2	3.9	0.4%	11	2.6	2.0%
135	7	1.9	1.2%	0	0.0	0.0%	7	1.7	1.2%
136	9	2.5	1.6%	0	0.0	0.0%	9	2.2	1.6%
137	5	1.4	0.9%	0	0.0	0.0%	5	1.2	0.9%
138	7	2.0	1.2%	0	0.0	0.0%	7	1.7	1.2%
139	5	1.4	0.9%	0	0.0	0.0%	5	1.2	0.9%
140	3	0.9	0.5%	0	0.0	0.0%	3	0.7	0.5%
141	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
142	3	0.9	0.5%	0	0.0	0.0%	3	0.8	0.5%
143	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
144	2	0.6	0.4%	0	0.0	0.0%	2	0.5	0.4%
145	1	0.3	0.2%	0	0.0	0.0%	1	0.3	0.2%
146	1	0.3	0.2%	0	0.0	0.0%	1	0.3	0.2%
147	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
148	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
149	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
150	0	0.0	0.0%	0	0.0	0.0%	0	0.0	0.0%
151	1	0.3	0.2%	0	0.0	0.0%	1	0.3	0.2%
Total No.	493		87.9%	68		12.1%	561		100.0%
Mean		117.8			119.8			118.1	

Total legal 561

Total Recruits 234
Percent 41.7%

Total Post Recruits 327
Percent 58.3%

Table 4. Red king crab tag information recovered during the Norton Sound commercial red king crab harvest, July 1 - September 4, 1999.

Tag Number	Capture Date	Stat. Area of Capture	Carapace Length (mm)	Shell Age	Tagging Date	Tagging Location ^b	Carapace Length (mm)	Shell Age	Growth (mm)	No. of Molts ^a	Skip Molts	Average Growth per Molt (mm)
NZ3815	7/14/1999	656403	93	New	3/11/1999	W4	93	New	0			
NX3572	7/18/1999	636401	no info		3/14/1999	W5	98	New				
NZ3412	7/18/1999	636401	no info		3/20/1999	N3	97	New				
NZ4017	7/22/1999	656403	98	New	4/7/1999	W1	98	New	0			
NZ3973	7/22/1999	656403	92	New	3/30/1999	N3	92	New	0			
NX3685	7/26/1999	656330	no info			no info found						
NZ4015	7/27/1999	656403	92	New	3/22/1999	N3	93	New	-1			
NX3017	8/16/1999	656330	131	Old	3/9/1995	W3	94	New	37	3	1	12.3
												12.3

^a Crab growth of 12 mm (+/- 5mm) per year is thought to be the average growth in one molting period.

^b B1= Bluff area, 45 miles east of Nome.

B4=Bluff area, 50 miles east of Nome.

E1=4.78 miles east of Nome

E2=5.2 miles east of Nome

E3=7.9 miles east of Nome.

E4=9.5 miles east of Nome.

N2=0.85 miles south of Nome.

Figure 1. King crab fishing districts and sections of Statistical Area Q.

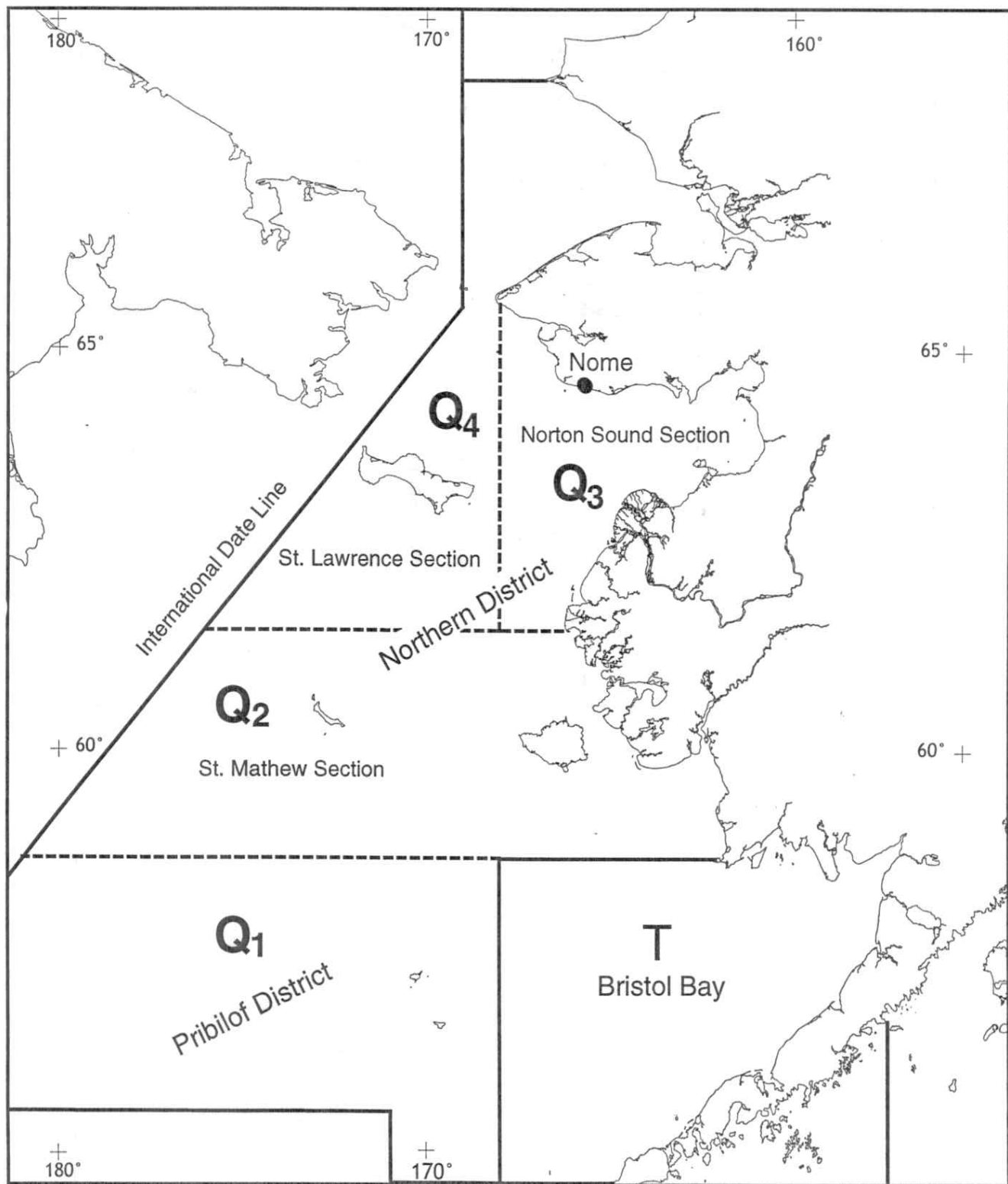
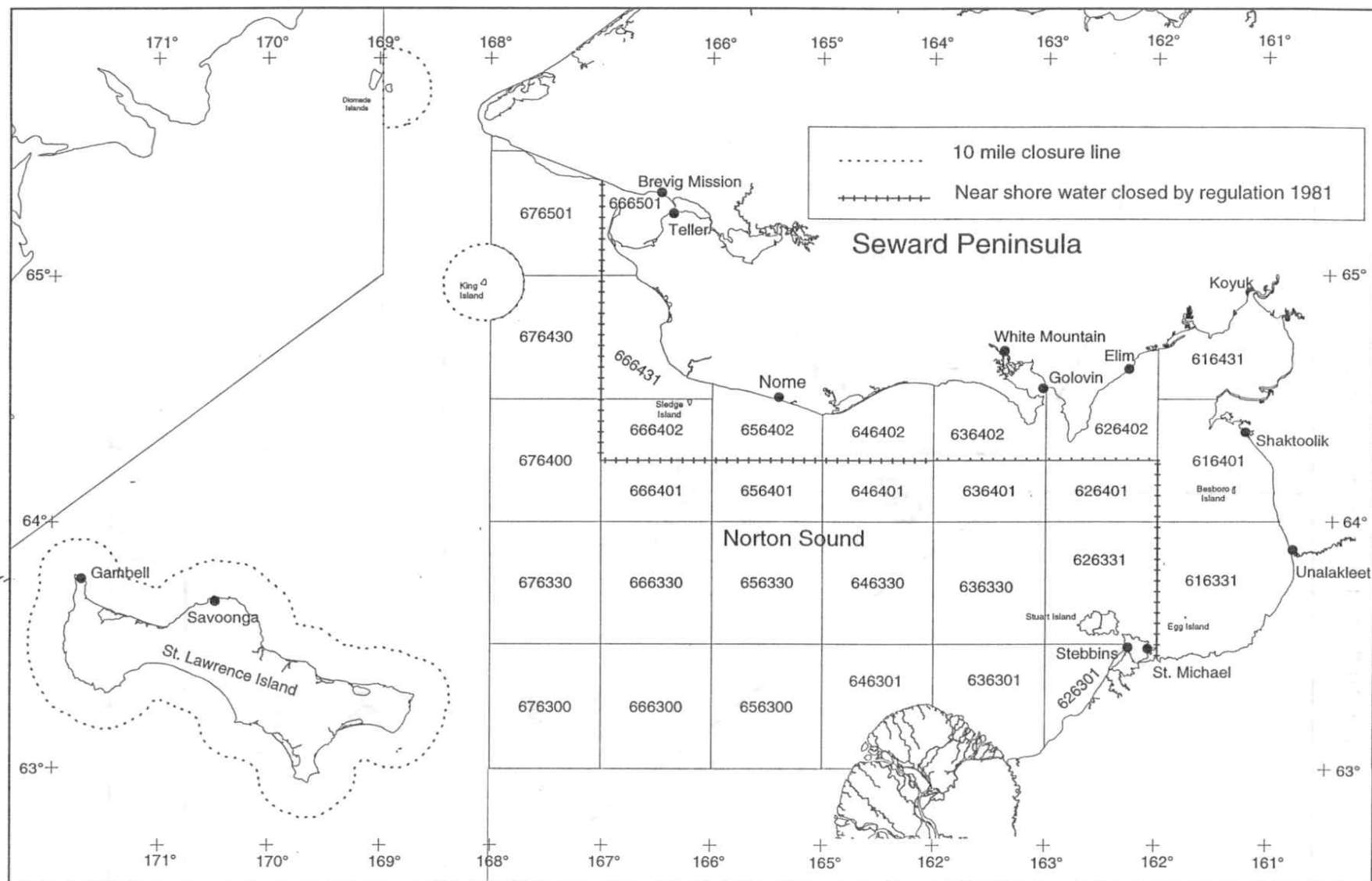


Figure 2. Norton Sound red king crab statistical areas.



1999 Norton Sound Red King Crab

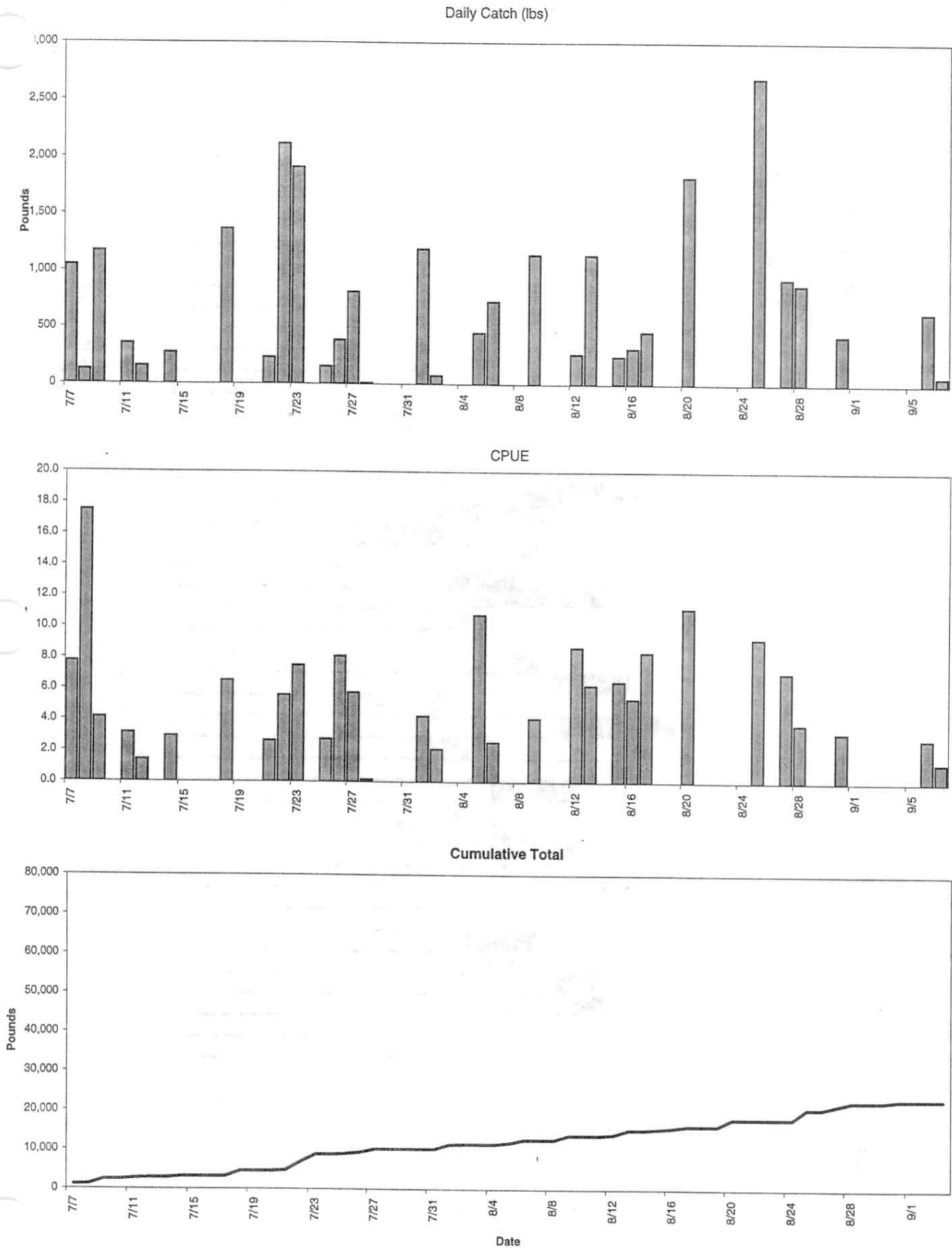


Figure 3. Daily catch, daily CPUE, and cumulative daily catch, Norton Sound summer commercial red king crab fishery, July 1 - September 4, 1999 .

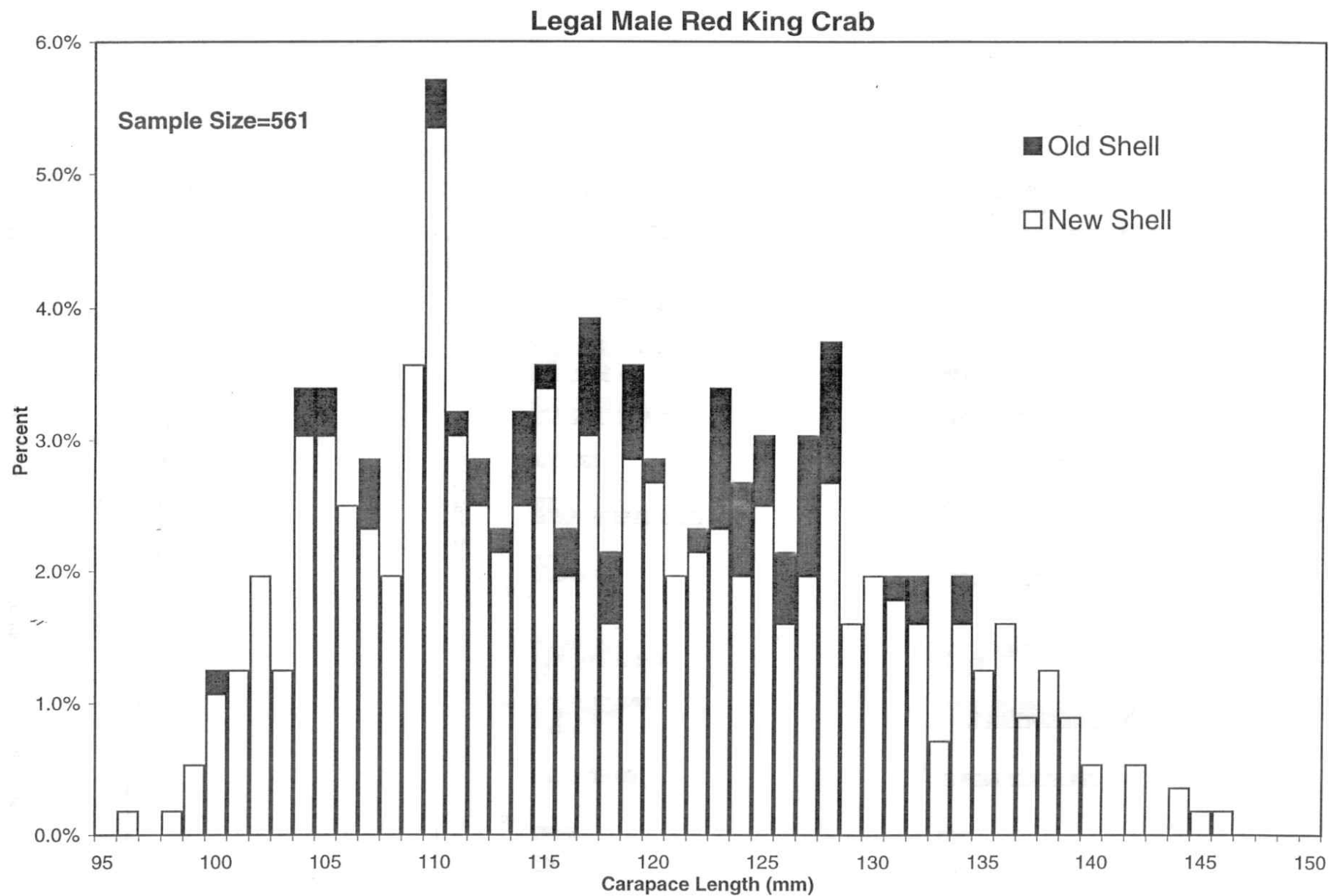


Figure 4. Length frequency distribution of new and old carapace age condition legal male red king crab, sampled from the Norton Sound summer commercial king crab fishery, July 1 - September 4, 1999 and from the 1999 Norton Sound king crab trawl survey.

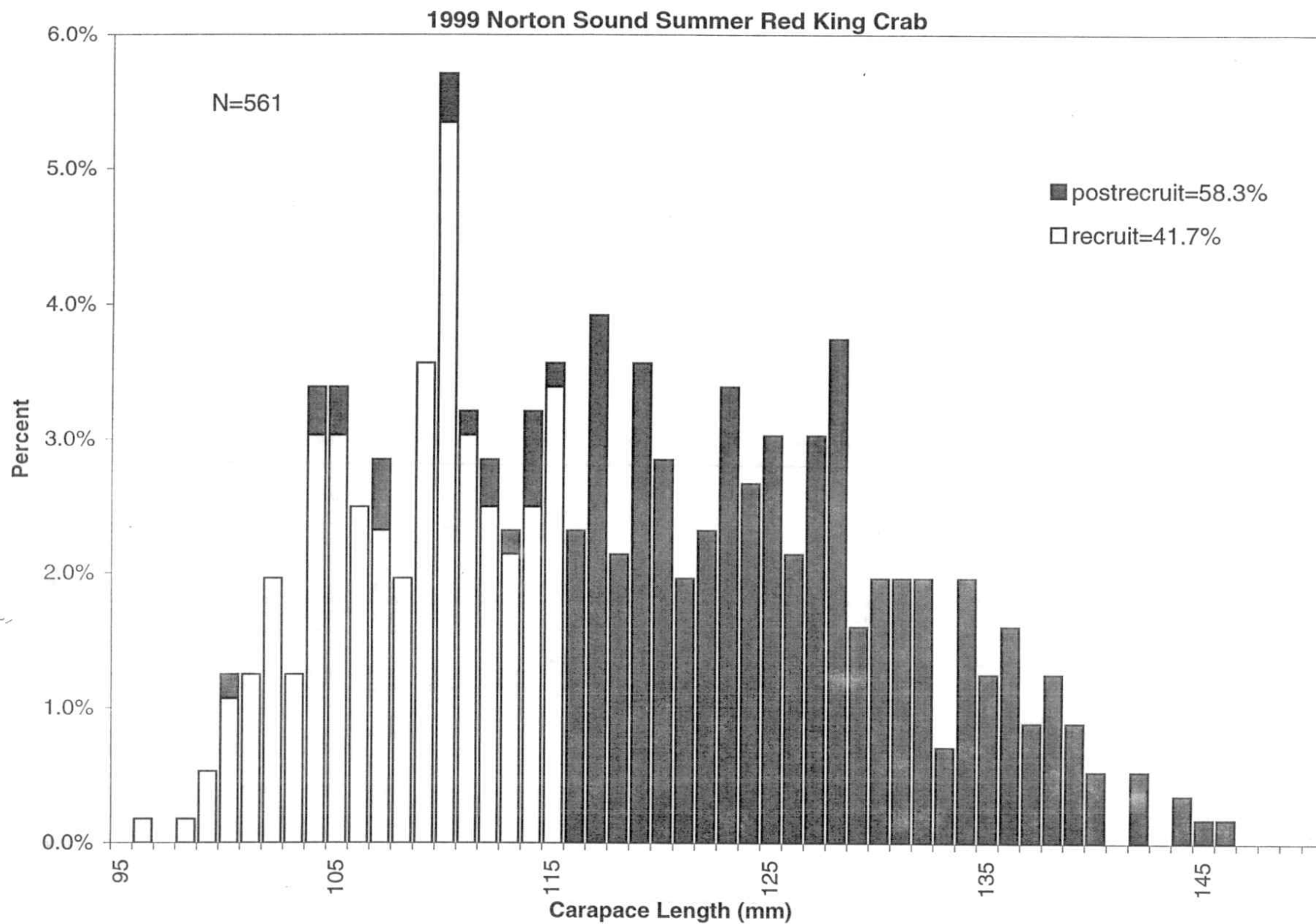


Figure 5 . Carapace length measurement summary of sampled legal male red king crab captured during the commercial king crab harvest, July 1 - September 4, 1999 and during the 1999 Norton Sound king crab trawl survey.

Appendix Table 1. Historic commercial harvest of red king crab from Norton Sound Section, Eastern Bering Sea, by statistical areas, 1977-1999 (catch in pounds).^a

Statistical Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1992	1993	1994	1995	1996 ^b	1997	1998	1999	Totals
616331	7,893																48					633	7,941
616401																		35					35
626331	40,020					22													61				40,103
626401	31,572			4,830	399													18,971	45,045	18,066	8,065	508	126,948
626402	38,995																						38,995
636330																			4,560	3,838	2,449		10,847
636401				12,398	61,823	32,246	5,880	41	891			22,030			1,159	1,373	8,087	24,329	70,677	59,206	10,771	14,201	310,911
636402																	1,754	3,466					5,220
646301																		4,628	13,888				18,516
646330					4,716								5,212					1,493	2,894	314		3,021	14,629
646401			155,972		1,319	17,532											1,963	37,222	105,045	22,834	1,052	3,194	221
646402	80,969					748											730	143,511	66,821				292,779
656300			161,699		15,174																		176,873
656330			323,518	72,735	395,662	3,983	24,246	83,479	7,632		79,006	36,129	1,757			4,814	265	19,745	15,446	4,661	4,078	1,300	1,077,156
656401			138,011	121,147	253,387	60,480	11,422	183,119	246,200		194,408	165,644	100,956		171	53,119	105,341	29,566	32,289	9,985	4,035	1,127	1,710,407
656402	306,302	90,187	288,869	918	3,098	2,832			132,363								193,079	106,053	44,000				1,167,701
666230		55,490			77																		55,567
666300		162,795	60,816	84,874	9,167	95		4,534											25,519				347,800
666330		353,016	505,050	367,446	141,513	8,990	1,192		389	70,615	2,963	13,020	1,275	27,185	4,305	31,758		730					1,529,447
666401		179,212	486,947	205,400	381,510	79,580	325,045	116,254	5,341	408,848	50,744	21,895	115,257	162,263	10,632	746	396		3,001	1,816		930	2,554,887
666402	12,036	515,778	534,938	183,581		17,585			32,992							535	1,221						1,298,666
666431			146,029															1,124					147,153
676300		13,238		126,231															546				140,015
676330		51,304	81,798	6,762	18,734																		158,598
676400		667,130	33,856	274	92,026	1,315	247		32					3,212				9,775					807,867
676430		3,811	12,309		373	3,513			1,171														21,177
676501					36																		36
686330			1,860																				1,860
Totals	517,787	2,091,961	2,931,672	1,186,596	1,379,014	228,921	368,032	387,427	427,011	479,463	327,121	236,688	246,487	192,831	74,029	335,790	327,858	322,676	224,231	92,988	29,684	23,553	12,431,820

^a No commercial fishery occurred in 1991.^b Does not include approximately 2,490 lbs not reported on fish tickets.

Appendix Table 2. Historic summer commercial red king crab annual harvest, Norton Sound Section, Eastern Bering Sea, 1977 - 1999.

Year	Number of Vessels	Number of Permits	Number of Landings	Number of Crab	Harvest (lbs) ^{a,b}	Number of Pot Lifts	CPUE	Percent Old Shell	Average Weight (lbs)	Avg. Legal Mean Length (mm)
1977	7	7	13	195,877	0.52	5,457	36	^d	2.7	113.4
1978	8	8	54	660,829	2.09	10,817	64	^d	3.0	118.9
1979	34	34	76	970,962	2.93	34,773	28	^d	3.0	119.8
1980	9	9	50	329,778	1.19	11,199	29	^d	3.6	125.8
1981	36	36	108	376,313	1.38	33,745	11	^d	3.7	128.5
1982	11	11	33	63,949	0.23	11,230	6	^d	3.6	125.4
1983	23	23	26	132,205	0.37	11,195	12	^d	2.8	115.2
1984	8	8	21	139,759	0.39	9,706	14	^d	2.8	112.5
1985	6	6	72	146,669	0.43	13,209	11	^d	2.9	115.8
1986	3	3	^d	162,438	0.48	4,284	38	^d	2.9	115.9
1987	9	9	^d	103,338	0.33	10,258	10	13	3.2	121.7
1988	2	2	^d	76,148	0.24	2,350	32	26	3.1	119.0
1989	10	10	^d	79,116	0.25	5,149	15	29	3.1	119.8
1990	4	4	^d	59,132	0.19	3,172	19	17	3.1	121.1
1991 ^c										
1992	27	27	^d	24,902	0.07	5,746	4	29	3.0	119.7
1993	14	20	208	115,913	0.33	7,063	16	10	2.9	119.1
1994	34	52	407	108,824	0.32	11,729	9	71	3.0	118.8
1995	48	81	665	105,967	0.32	18,782	5.6	21	3.0	118.2
1996	41	50	264	74,752	0.22	10,453	7.1	36	3.0	117.1
1997	13	15	100	32,606	0.09	2,982	10.9	14	2.8	115.7
1998	8	11	50	10,661	0.03	1,639	6.5	39	2.8	116.9
1999	10	9	53	8,734	0.02	1,630	5.4	12	2.7	118.1

^a Deadloss included in total.

^b Millions of pounds.

^c No summer commercial fishery.

^d Information not available.

Appendix Table 3. Historic summer commercial red king crab fishery economic performance, Norton Sound Section, Eastern Bering Sea, 1977 - 1999.

Year	Guideline Harvest Level (lbs) ^b	Legal Male Pop. Est.(lbs) ^b	Commercial Harvest (lbs) ^{a,b}	Number of			Number of Pots		Exvessel Price/lb	Fishery Value (millions \$)	Season Length	
				Vessels	Permits	Landings	Registered	Pulls			Days	Dates
1977	^d	10.0	0.52	7	7	13	^d	5,457	0.75	0.229	60	^d
1978	3.00	11.0	2.09	8	8	54	^d	10,817	0.95	1.897	60	6/7-8/15
1979	3.00	5.4	2.93	34	34	76	^d	34,773	0.75	1.878	16	7/15-7/31
1980	1.00	6.6	1.19	9	9	50	^d	11,199	0.75	0.890	16	7/15-7/31
1981	2.50	4.7	1.38	36	36	108	^d	33,745	0.85	1.172	38	7/15-8/22
1982	0.50	1.3	0.23	11	11	33	^d	11,230	2.00	0.405	23	8/9-9/1
1983	0.30	2.1	0.37	23	23	26	3,583	11,195	1.50	0.537	3.8	8/1-8/5
1984	0.40	2.7	0.39	8	8	21	1,245	9,706	1.02	0.395	13.6	8/1-8/15
1985	0.45	2.4	0.43	6	6	72	1,116	13,209	1.00	0.427	21.7	8/1-8/23
1986	0.42	2.8	0.48	3	3	^d	578	4,284	1.25	0.600	13	8/1-8/25 ^e
1987	0.40	2.2	0.33	9	9	^d	1,430	10,258	1.50	0.491	11	8/1-8/12
1988	0.20	3.2	0.24	2	2	^d	360	2,350	^d	^d	9.9	8/1-8/11
1989	0.20	3.2	0.25	10	10	^d	2,555	5,149	3.00	0.739	3	8/1-8/4
1990	0.20	3.2	0.19	4	4	^d	1,388	3,172	^d	^d	4	8/1-8/5
1991 ^c	0.34	3.4										
1992	0.34	3.4	0.07	27	27	^d	2,635	5,746	1.75	0.130	2	8/1-8/3
1993	0.34	3.4	0.33	14	20	208	560	7,063	1.28	0.430	52	7/1-8/28 ^f
1994	0.34	3.4	0.32	34	52	407	1,360	11,729	2.02	0.646	31	7/1-7/31
1995	0.34	3.4	0.32	48	81	665	1,900	18,782	2.87	0.926	67	7/1-9/5
1996	0.34	3.4	0.22	41	50	264	1,640	10,453	2.29	0.519	57	7/1-9/3 ^g
1997	0.08	1.6	0.09	13	15	100	520	2,982	1.98	0.184	44	7/1-8/13 ^h
1998	0.08	1.6	0.03	8	11	50	360	1,639	1.47	0.041	65	7/1-9/3 ⁱ
1999	0.08	1.6	0.02	10	9	53	360	1,630	3.08	0.073	66	7/1-9/4 ^j

^a Deadloss included in total.

^b Millions of pounds.

^c No summer commercial fishery.

^d Information not available.

^e Fishing actually began 8/12.

^f Fishing actually began 7/8.

^g Fishing began 7/9 due to fishermen's strike.

^h First delivery was made 7/10.

ⁱ First delivery was made 7/16.

^j The season was extended 24 hours due to bad weather.

Appendix Table 4. A comparison of the proportion of recruit and postrecruit king crab sampled from summer commercial harvest, Norton Sound Section, Eastern Bering Sea, 1983 - 1999.

Year	Summer Commercial	
	Recruits (%)	Postrecruits (%)
1983	55	45
1984	59	41
1985	45	55
1986	48	52
1987	22	78
1988	25	75
1989	23	77
1990	21	79
1991 ^a		
1992	28	72
1993	31	69
1994	14	86
1995	36	64
1996	30	70
1997	49	51
1998	32	68
1999	42	58

^a No data collected in summer 1991 due to closed fishery.

Appendix Table 5. The results of the population assessment surveys conducted for red king crab in Norton Sound since 1976.

Year	Date	Research Agency	Gear	<u>Population Abundance Estimates</u> (Number of crab)		
				Pre-2 Males ^b	Pre-1 Males ^b	Legal Males ^a
1976	9/2 - 9/5, 9/16 - 10/7	NMFS	Trawl	331,555	808,091	1,742,755
1979 ^c	7/26 - 8/5	NMFS	Trawl			809,799
1980 ^d	7/4 - 7/14	ADF&G	Pots			1,900,000
1981	6/28 - 7/14	ADF&G	Pots			1,285,195
1982	7/6 - 7/20	ADF&G	Pots			353,273
1982	9/5 - 9/11	NMFS	Trawl	356,724	832,581	877,722
1985	7/1 - 7/14	ADF&G	Pots			907,579
1985	9/16 - 10/1	NMFS	Trawl	466,858	707,140	1,051,857
1988	8/16 - 8/30	NMFS	Trawl	565,255	493,030	978,748
1991	8/22 - 8/30	NMFS	Trawl	294,801	303,682	1,287,486
1996	9/7 - 9/18	ADF&G	Trawl	452,580	325,699	536,235
1999	7/28 - 8/7	ADF&G	Trawl	Information not available yet		

^a Legal male red king crab were defined as at least 105 mm in carapace length for the 1996 ADF&G trawl survey and all NMFS trawl surveys except the 1979 survey which defined legal males as at least 100 mm in carapace length. ADF&G pot surveys defined legal males as at least 121 mm in carapace width.

^b Pre-2 males were defined as 76-89 mm in carapace length and pre-1 males were defined as 90-104 mm in carapace length.

^c Population estimates are valid for the date of the survey (i.e., either before or after the summer commercial fishery).

^d The 1980 pot survey estimate has been revised from the original estimate of 13.4 million pounds which was thought inaccurate due to an under-reporting of recovered tagged crab.

^e Pre-2 male and pre-1 male data is unavailable for the 1979 NMFS trawl survey.